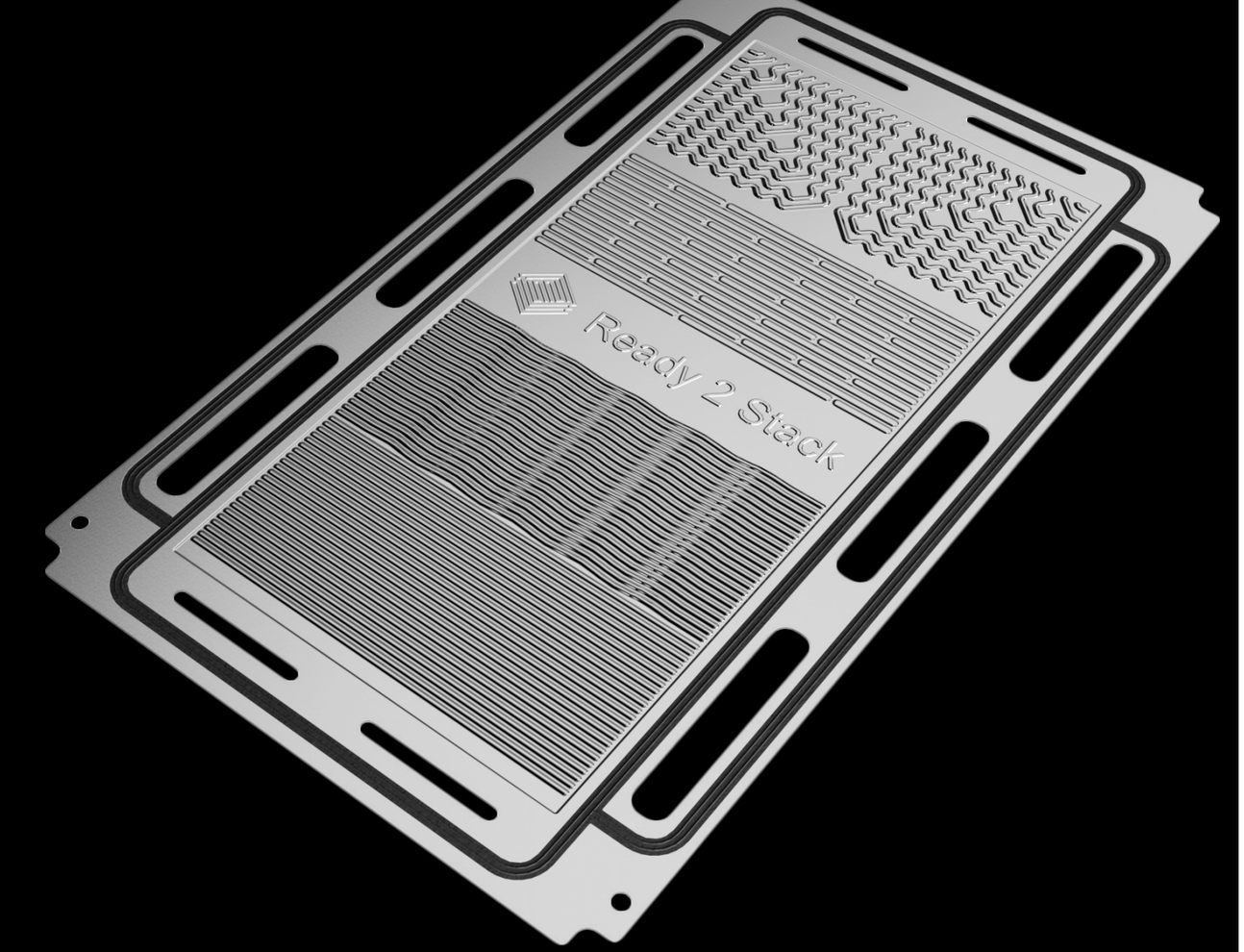
Ready 2 Stack

High-Performance Drop-In Bipolar Plates

For Electrolysers



About Ready2Stack™

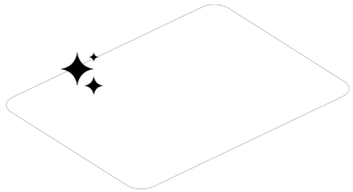
Shaping the future of green hydrogen.

Introducing Ready2Stack™, a complete bipolar plate (BPP) solution engineered to facilitate efficient electrolyser stack assembly and operation. Designed both for optimum performance and ease of use, it is a drop-in solution for electrolyser and fuel cell manufacturers.

Ready2Stack™ leverages decades of electrochemical and engineering expertise and is the result of a collaboration between industry leaders HOERBIGER and JAMES CROPPER. Developed specifically to address the industry's need for a complete, customized metallic BPP solution; it simplifies the supply chain, overcoming the challenges of inefficient sourcing and poor part compatibility, while simultaneously delivering outstanding in-stack performance, stability and lifetime.

High-Performance Drop-In Bipolar Plates (BPPs)

We take care of everything, from sourcing to sealing. Simplifying supply and ensuring optimised BPP design and stack performance.



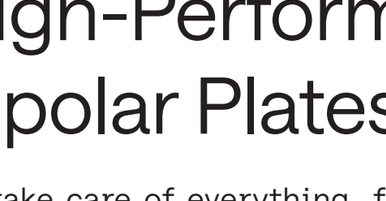
Sourced

High quality titanium grade 1 and stainless steel.

Sourced in range of thicknesses from 0.1 mm up to 1.0 mm, to meet specific application needs.

Part size active area of up to 3000 cm^2 and beyond.

Ready2Stack™ utilises customised material, specified to improve component geometry and ensure high quality throughout the process.

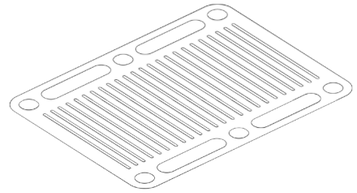


Coated

Using Resillion™ specialised coating technology to enhance performance efficiency and durability.

Withstands and protects against oxidation and hydriding, to increase BPP lifespan.

Protects BPP against hydrogen embrittlement, improving fluoride ion tolerance to extend stack lifetime.

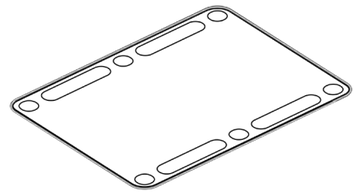


Formed

Precisely formed parts manufactured using innovative forming strategies, enabling maximum design freedom and consistent quality.

Automotive quality parts as standard, ranging from small scale prototypes to high volume production of millions of parts.

State-of-the-art laser welding for joining half-shells or complete BPPs to auxiliary stack elements.



Sealed

Optimised seals for all interfaces and operating conditions, ensuring durability and performance over the stack lifetime.

Injection moulded or dispensed seals in a variety of materials (FKM, EPDM, silicone rubber) to ensure system specific requirements are met.

In-house validation guarantees consistent component quality and characteristic conformity. Plates exhibit a very low leakage rate of below $7.2e^{-7}$ mbar·l/s at 1 bar_g testing pressure.

Prior to sealing, BPPs can undergo additional processes, such as washing, in preparation for optimal sealing application and the stack environment.

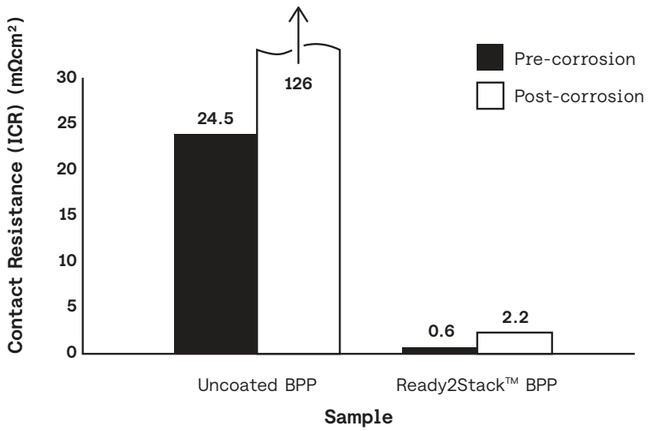
Outstanding Performance & Durability

Corrosion Resistance

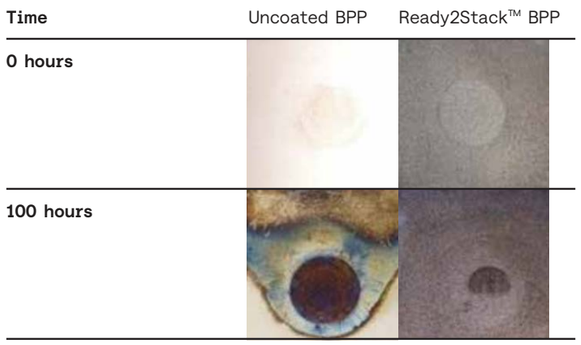
Ready2Stack™ provides exceptional fluoride protection during PEMWE operation. The contact resistance remains low even after undergoing corrosion tests.

Low pressure contact resistance (ICR) pre/post corrosion, Ready2Stack™ vs uncoated BPP

Temp: 80°C
Time: 100 hours
Voltage: 2.2V vs SHE
0.5mM H_2SO_4, 20ppm F^-



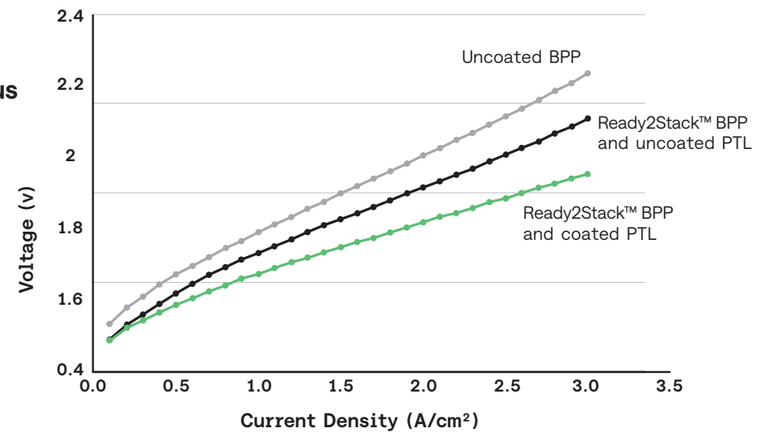
Corrosion test conditions: pH2.8 @ 2.2Vx100h, Ti - grade 1



Polarisation Curves

Ready2Stack™ enables PEM electrolysers to operate at higher current densities, resulting in improved energy efficiency.

Polarisation curves (BOT) for Ready2Stack™ versus an uncoated BPP - commercial catalyst



Ready2Stack™, Ready to Scale

Ready2Stack™ bipolar plates are designed and manufactured with scalability in mind, both in terms of part size and quantities.

Supply is adaptable to meet customer needs, accommodating quantities ranging from the **small scale prototyping** of parts to large scale production on multi-stage presses of up to **8 million BPPs per annum**.

Ready 2 Stack

Design & Development

Creating Your Solution

Creating each system specific Ready2Stack™ solution involves a meticulous approach to BPP design and manufacture. This process ensures optimum compatibility and in-stack performance.

The resulting BPP is a highly engineered drop-in solution that improves the efficiency of an electrolyser stack, while offering ease of use and simplification of the supply chain.

Step 1
Analysis of requirements and feasibility study

Step 2
Develop and finalise BPP design ready for manufacture

Step 3
Forming and cutting of plate to automotive quality standards

Step 4
Option of laser welding (if half shells)

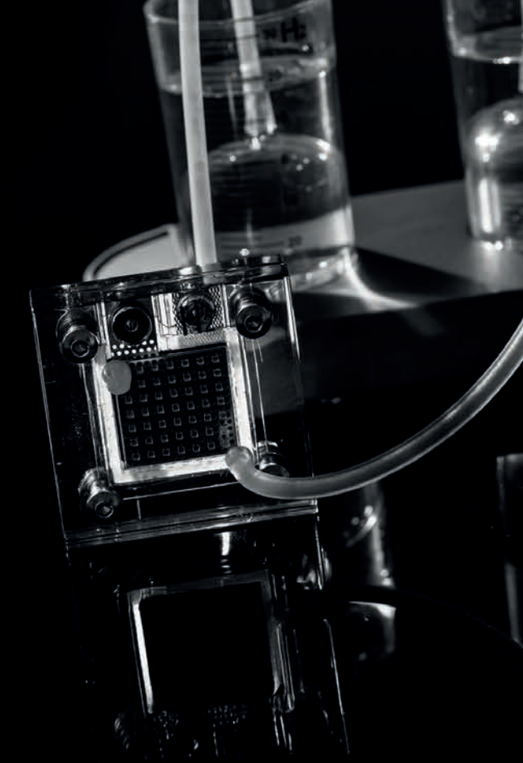
Step 5
Application of optimised coating using Resillion™ advanced coating technology

Step 6
Additional treatment if required (e.g. technical cleaning)

Step 7
Application of seals

Step 8
Validation and testing

Why Chose Ready2Stack™ Bipolar Plates?



With Ready2Stack™ BPPs performance, compatibility and ease of supply go hand-in-hand.

Maximum efficiency

Lower levelised cost of ownership.

Improved efficiency with a degradation rate of < 4 µV/h ensuring long-term stability.

Outstanding performance

Enables extended operation at 2 A/cm² below 2V.

Retains high efficiency over part lifetime.

Resource optimisation

High performance while ensuring efficient use of materials and resources.

Specialised coating technology optimized for low interfacial contact resistance (ICR).

Simplified supply chain

Consolidated processes from sourcing to sealing.

Reduces the logistical complexity by up to 80% - one supplier for all BPPs .

Rapidly scalable technology.

Perfect compatibility

Coatings, substrates and seals are all carefully designed to ensure seamless integration.

Carefully selected to ensure no issues with cohesion or compatibility.

Optimum design

Expertise and open dialogue with technical teams especially in early design phases.

Understanding of stack requirements to optimise the ‘design to manufacture’ process.

Quality assured

Highest standards of quality and sustainability.

Accredited to ISO 9001, ISO 5001 and ISO 14001.

Extensive experience in electrolyser and fuel cell component development.

Ready 2 Stack

JAMES CROPPER

Leaders in advanced materials, JAMES CROPPER operates at the forefront of material science, working alongside their partners to create solutions to the unique challenges of the electrolyser, fuel cell and battery industries.

From carbon nonwovens widely used as a fuel cell Gas Diffusion Layer (GDL) substrates to electrochemical coatings creating green hydrogen at the heart of PEM Electrolysers. JAMES CROPPER specialise in providing innovative solutions for current and next generation technologies. The company operates globally, with manufacturing sites in the UK and USA and a worldwide sales and technical support network. JAMES CROPPER's materials provide solutions for renewable energy, where there is a strong focus on enabling green technologies such as hydrogen fuel cells, carbon capture, batteries and PEM Electrolysers. Not limited to energy applications though, they also solve technical challenges across a wide range of industries from aerospace and defence, to automotive and construction.

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HOERBIGER

Locally close to customers and globally successful.

HOERBIGER is active worldwide in 43 countries on all continents. The company has 6,174 employees at 133 locations, including 30 production plants, delivering reliable solutions for better performance, increased safety, and fewer emissions. In 2023, the company generated sales of 1.416 billion euros.

For renowned customers from the energy sector, the process industry, the automotive industry, the mechanical engineering industry, safety technology, and the electronics industry, performance-determining products and services from HOERBIGER make the difference. Offering innovations for decarbonisation and energy transition, HOERBIGER is already enabling change today for a better tomorrow. As majority shareholder, the HOERBIGER Foundation preserves the 130-year-old entrepreneurial heritage of the company, guaranteeing it's stability, independence, and future-oriented strategy.

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